2019 Underwriting Issues & Innovation Seminar
July 28-30, 2019
Rosemont, IL

Deep Dive into New Underwriting Tools

Presenters:
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Milliman IntelliScript Risk Score with Credit Data

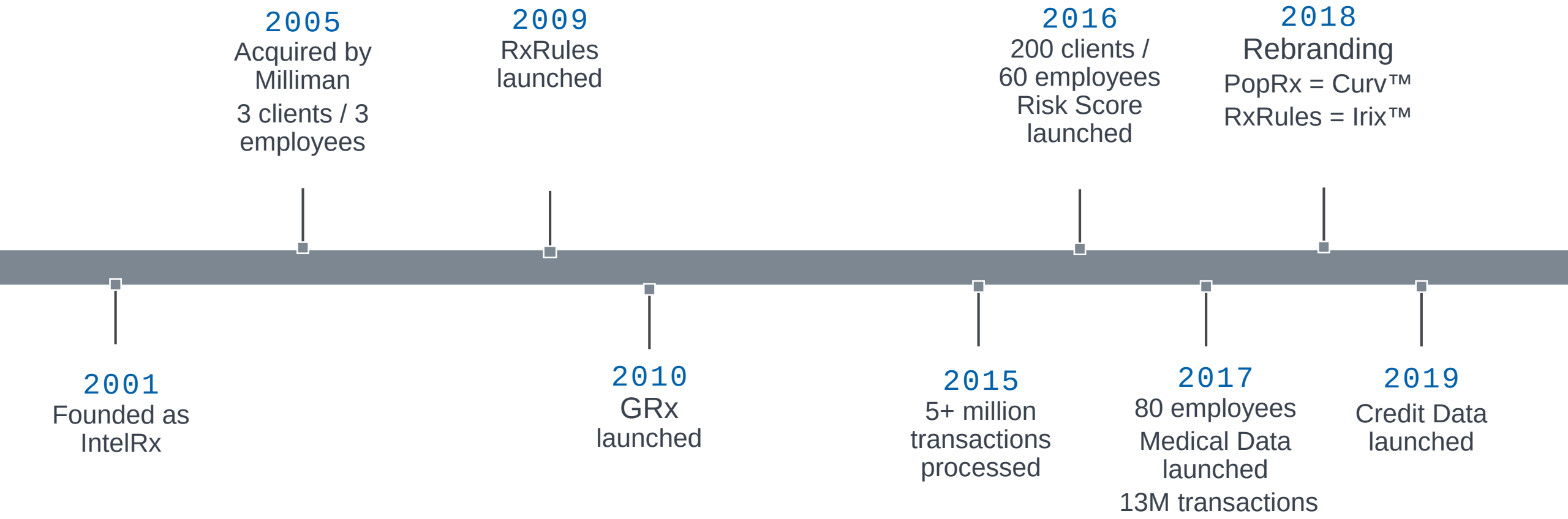
SOA Underwriting Issues & Innovations Seminar
Rosemont, IL

July 29, 2019

Agenda

- What is Risk Score?
- Introducing Risk Score w/ Credit Data
- Simplified issue case study
- Implementation hurdles

IntelliScript History



The Future of Underwriting …

Increasing	Decreasing
▪ Electronic requirements (Rx, Medical Data, MIB, MVR, Credit …) ▪ Decision engines driven by data ▪ Predictive Models ▪ Automation	▪ APS, Labs ▪ Cycle times ▪ Costs

Better Customer Experience

Mortality Study Timeline

2009

Milliman / RGA study

- 1M exposure years
- 2,500 deaths

2012

Milliman study

- 21M exposure years
- 45,000 deaths
- **Began to validate and expand Irix**

2015

Milliman study

- 53M exposure years
- 231,000 deaths
- **Created Risk Score**

2017

Milliman study

- 104M exposure years
- 469,000 deaths
- **Updated Risk Score**
- **Added Credit Data to Risk Score**

What is Risk Score?

Holistic multi-variate model of mortality risk

Predicts relative mortality

Delivered within the Irix system

Two different underwriting paradigms.

Paradigms

Clinical Underwriting

- Condition based
- Univariate
- Uses clinical expertise

Predictive Model

- Statistical basis
- Multivariate analysis
- Single risk metric for each case

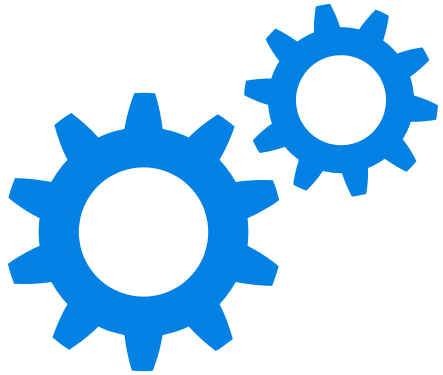
Predictive models like Risk Score have many benefits.

- Stratify risk within a given medical condition
- Evidence based and data driven
- Detect unintuitive patterns
- Quickly and consistently interpret large amounts of data
- Easy to test, implement, use, and update

Risk Score inputs can include Rx + Credit or just Rx data.

Irix™ – Risk Score (Rx)

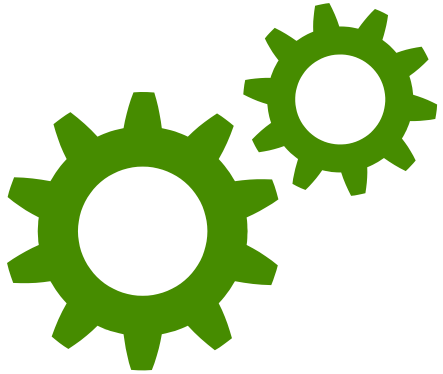
- Age & Gender
- Prescription Data



UW Guidance
- Decisions
- Rx rules messages

Irix™ – Risk Score (Rx, Cr)

- Age & Gender
- Prescription Data
- Credit Data



UW Guidance
- Decisions
- Rx rules messages
- Credit reason codes

What kind of “credit data” are we talking about?

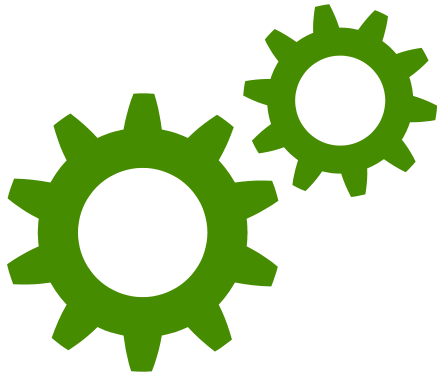
Types of Data	
Inquiries	Payment behavior
Number of accounts	Credit limits
Types of accounts	Collections
Outstanding amounts	Foreclosures
Derogatory marks	Bankruptcies

All data is FCRA compliant!

What happens when only some data is found?

Irix™ – Risk Score (Rx, Cr)

- **Age & Gender**
- **Prescription Data**
- **Credit Data**

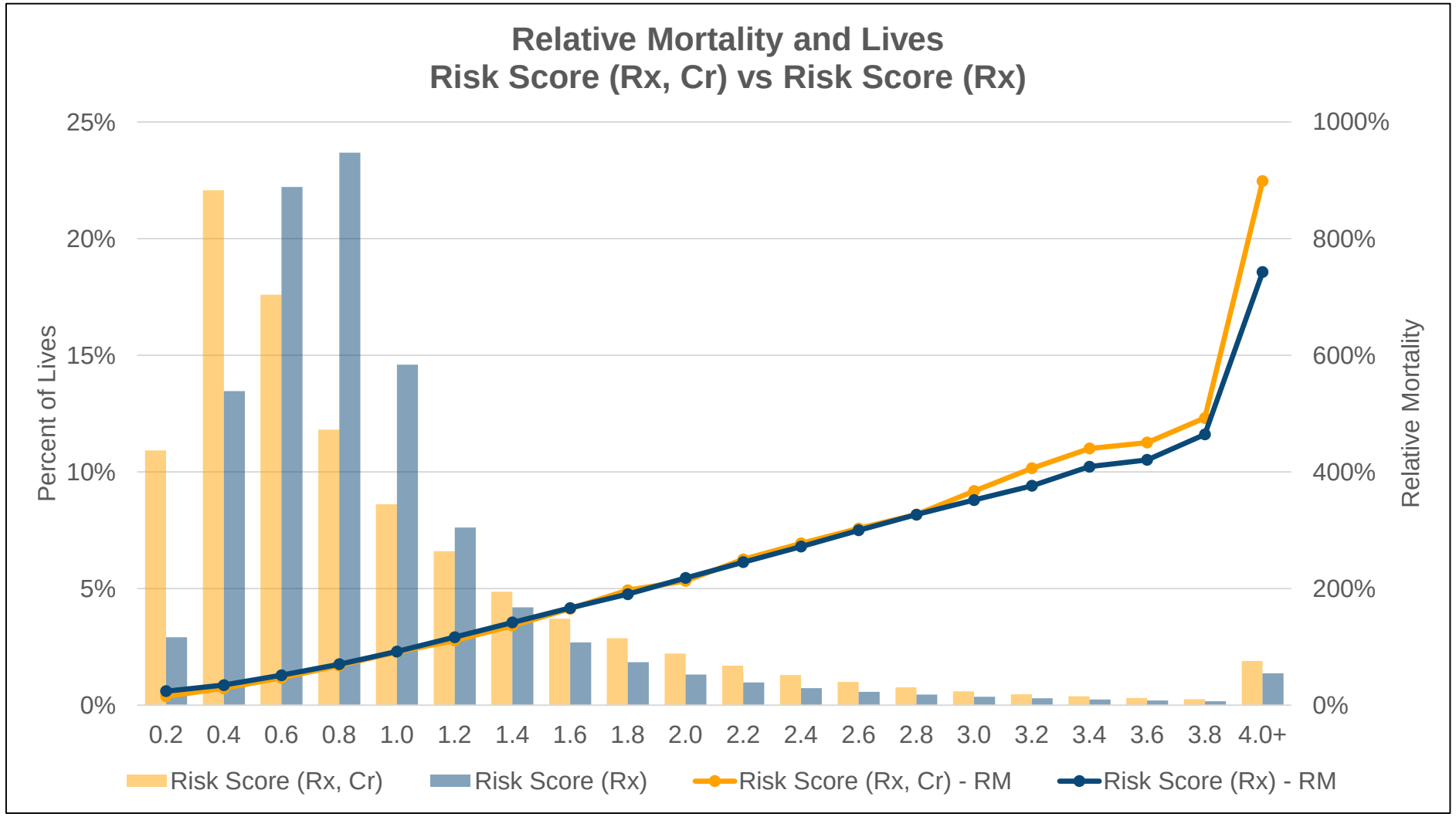


UW Guidance
- Decisions
- Rx rules messages
- Credit reason codes

A score will be returned wherever data is found.

1) Both Rx data and credit data are found
2) Only Rx data is found
3) Only credit data is found

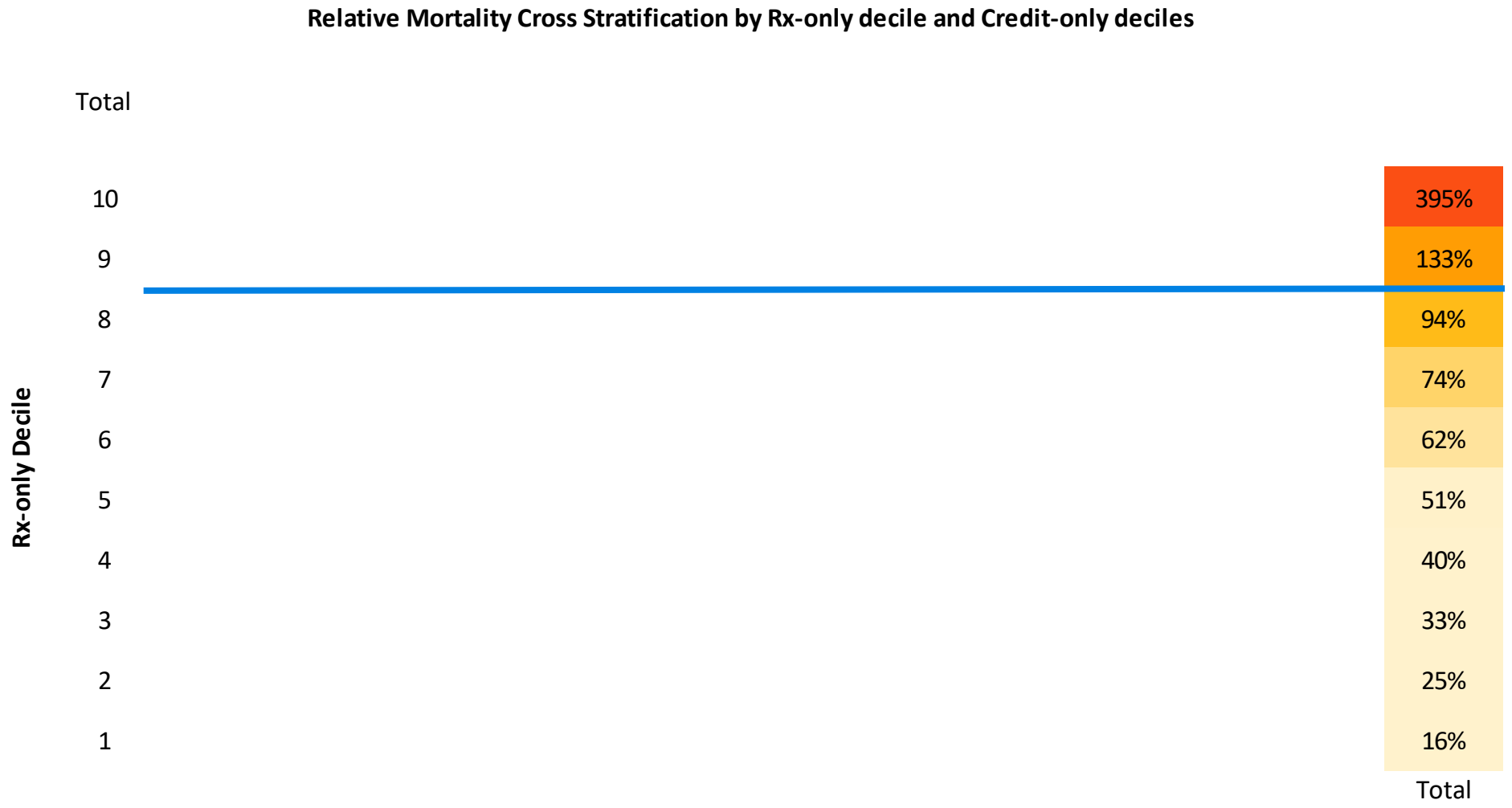
Risk Score effectively predicts mortality.



Why is a combined model superior to two separate models?

- Rx and credit data both stratify mortality risk in isolation
- Bringing the two together allows for more accurate risk assessments
- Interactions between the data elements uncover new insights

Using two separate models may lead to missed opportunities.



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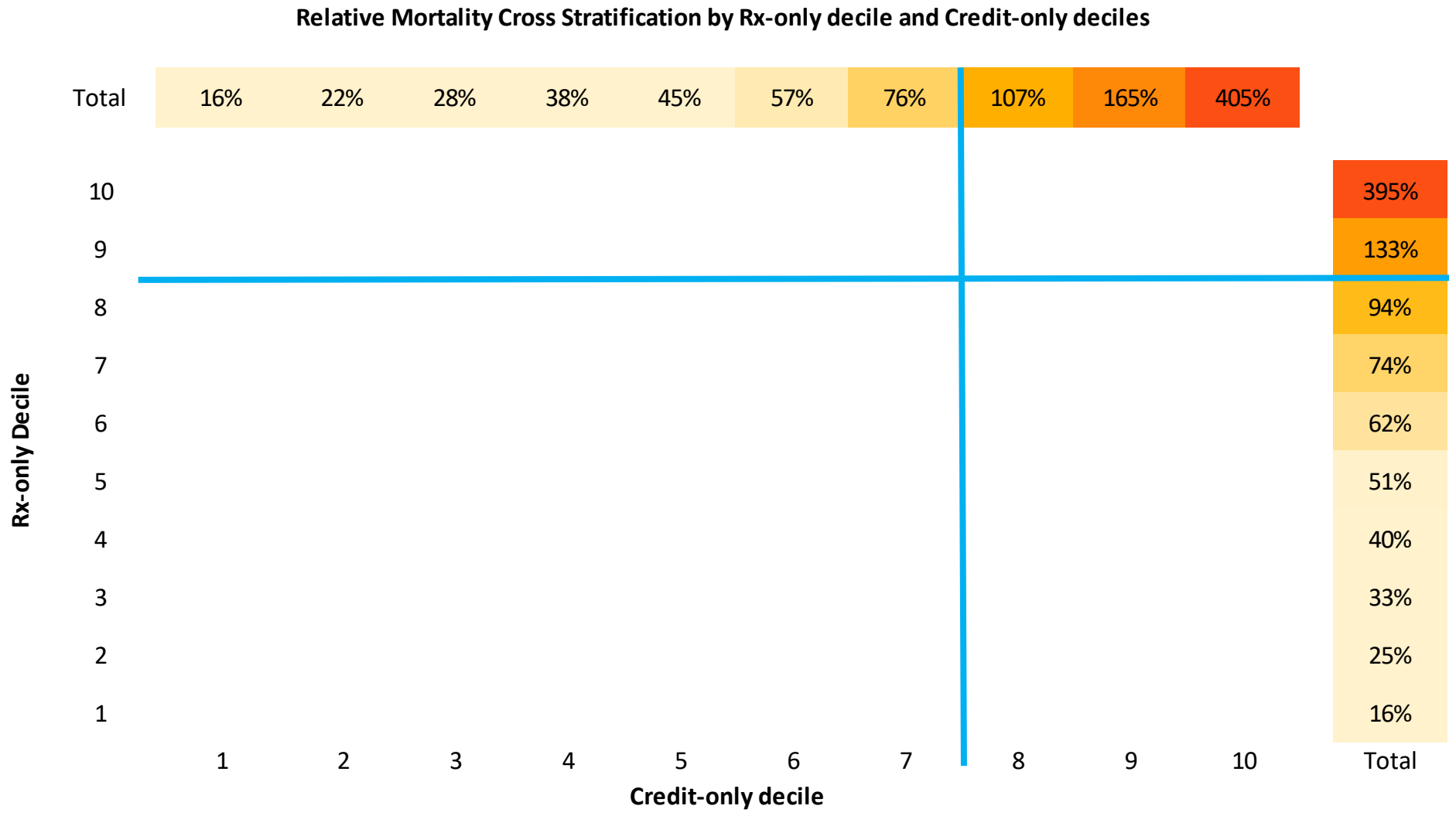

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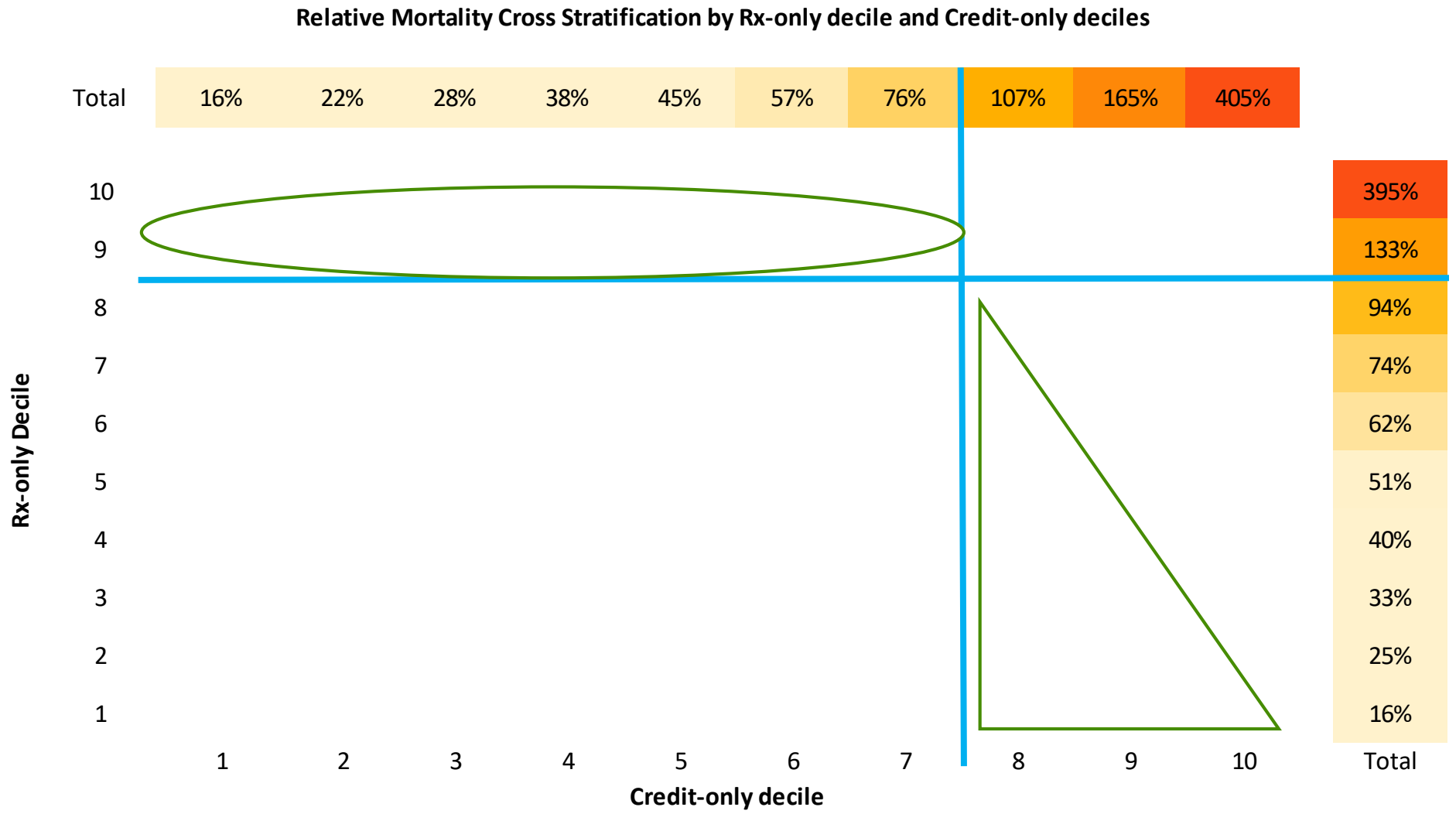

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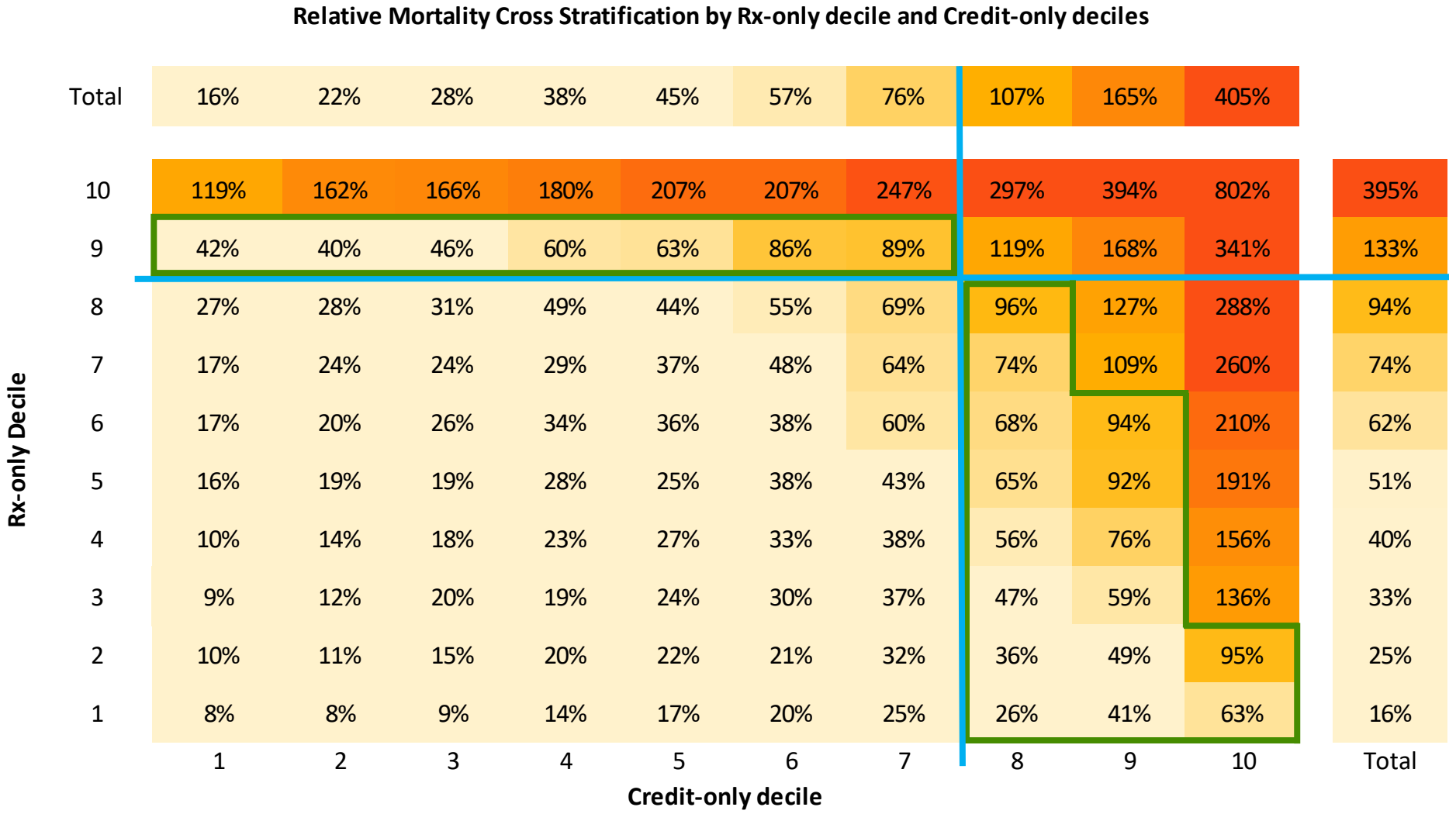
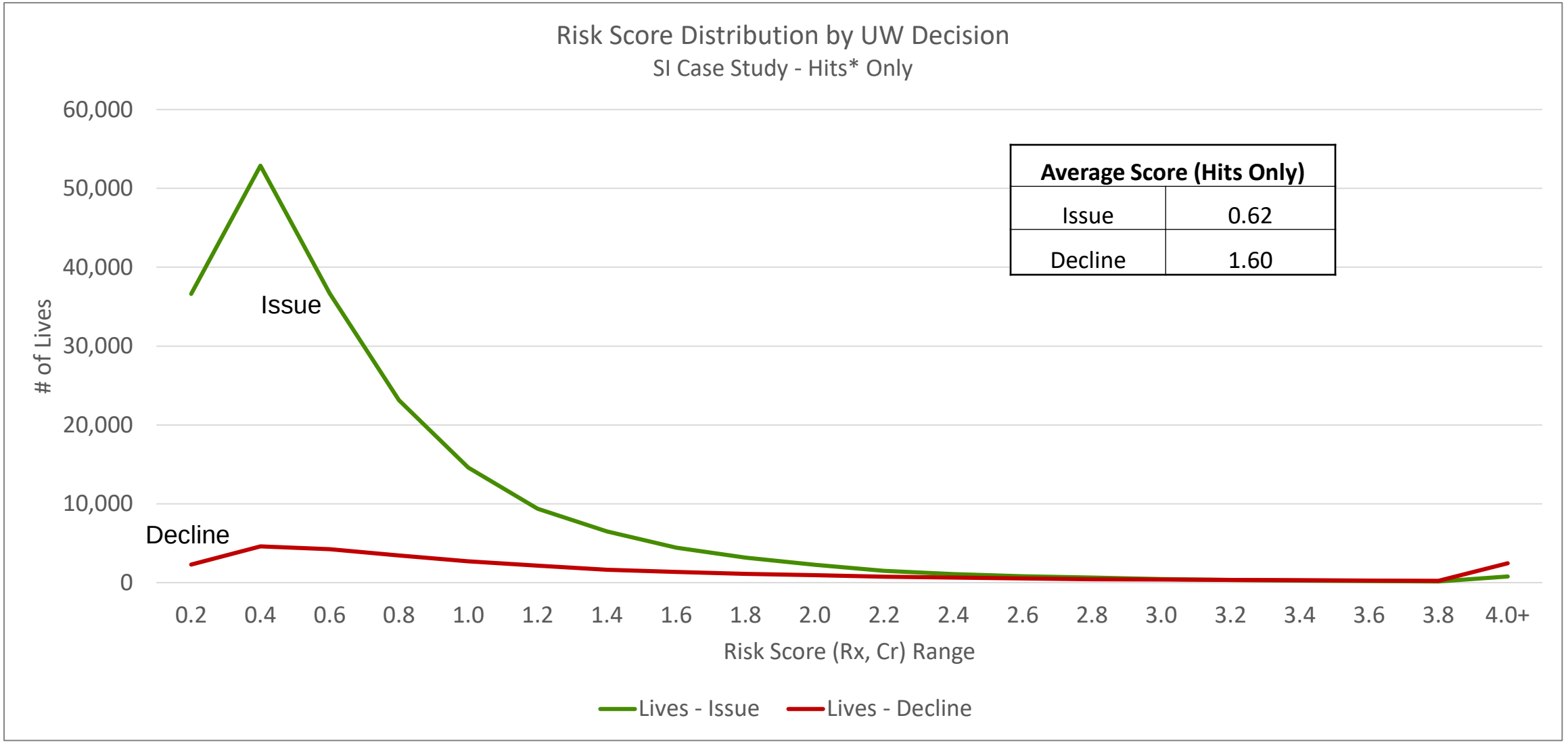


Rx-only Decile	1	2	3	4	5	6	7	8	9	10	Total
Total	16%	22%	28%	38%	45%	57%	76%	107%	165%	405%	
10	119%	162%	166%	180%	207%	207%	247%	297%	394%	802%	395%
9	42%	40%	46%	60%	63%	86%	89%	119%	168%	341%	133%
8	27%	28%	31%	49%	44%	55%	69%	96%	127%	288%	94%
7	17%	24%	24%	29%	37%	48%	64%	74%	109%	260%	74%
6	17%	20%	26%	34%	36%	38%	60%	68%	94%	210%	62%
5	16%	19%	19%	28%	25%	38%	43%	65%	92%	191%	51%
4	10%	14%	18%	23%	27%	33%	38%	56%	76%	156%	40%
3	9%	12%	20%	19%	24%	30%	37%	47%	59%	136%	33%
2	10%	11%	15%	20%	22%	21%	32%	36%	49%	95%	25%
1	8%	8%	9%	14%	17%	20%	25%	26%	41%	63%	16%

SI Case Study – Background

- Mostly auto-decision via Irix
- Risk Score as of time of underwriting
- Have deaths on issued **and declined** cases

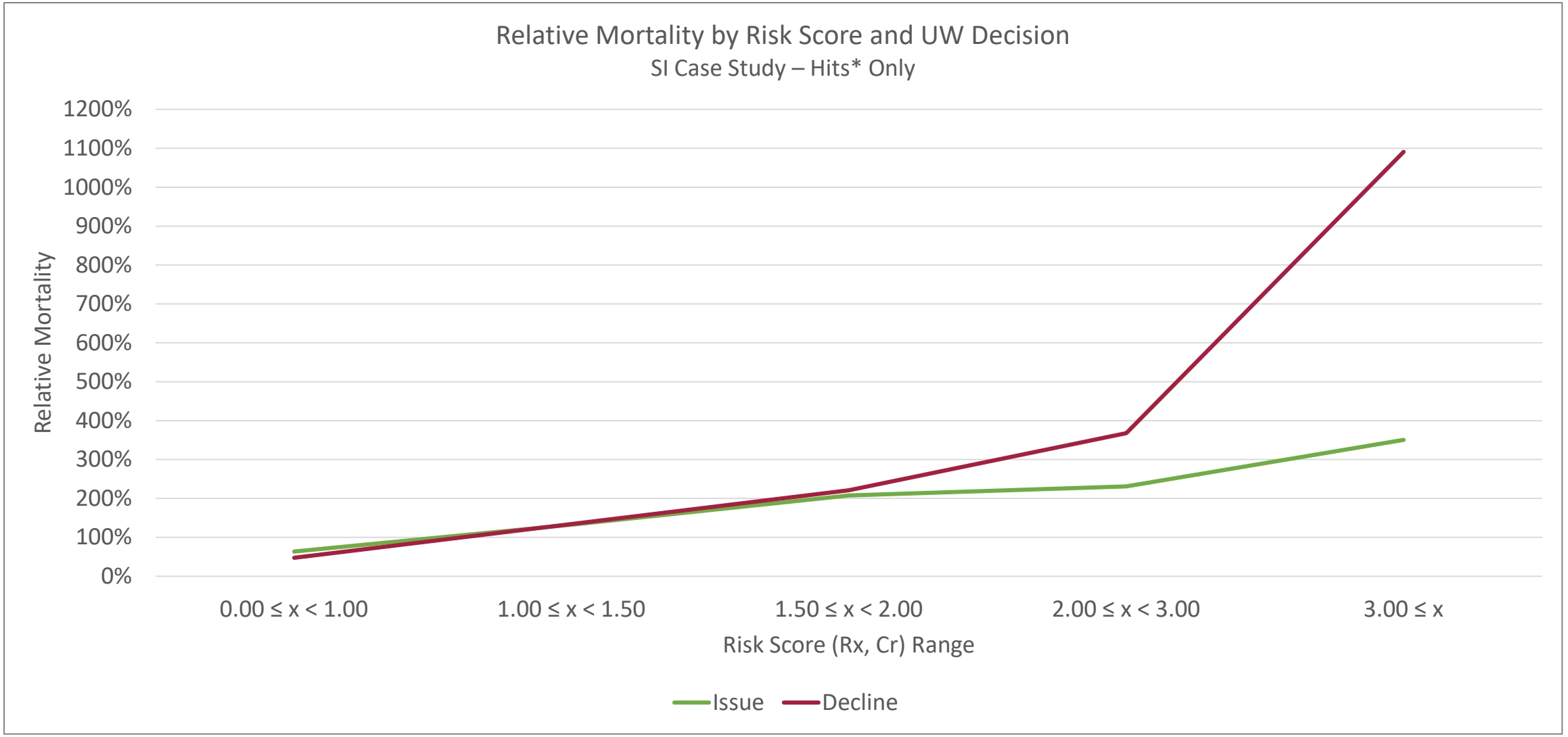
SI Case Study – Distribution of Lives



Average Score (Hits Only)	
Issue	0.62
Decline	1.60

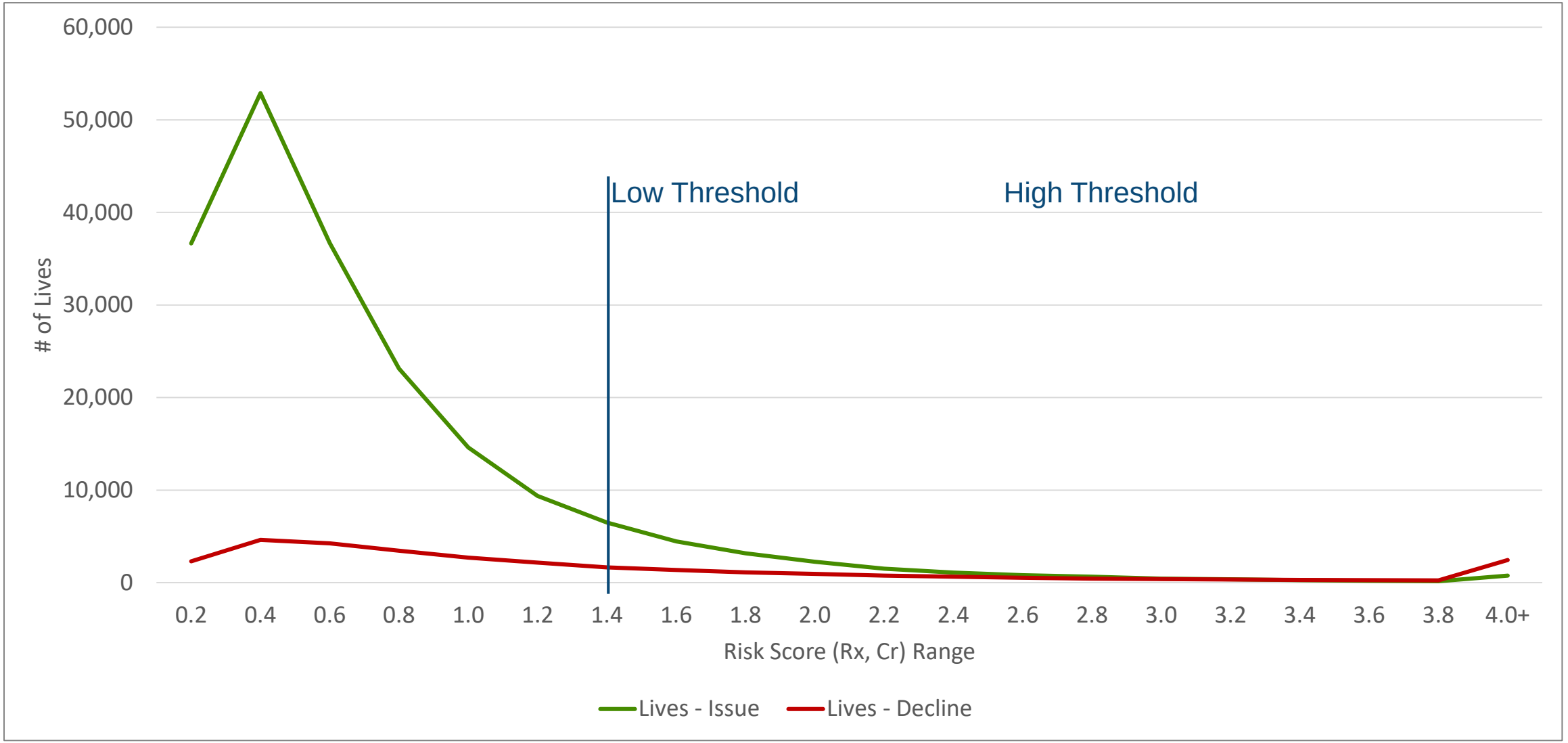
*Hit = Rx hit *or* Credit Hit

SI Case Study - Relative Mortality



*Hit = Rx hit *or* Credit Hit

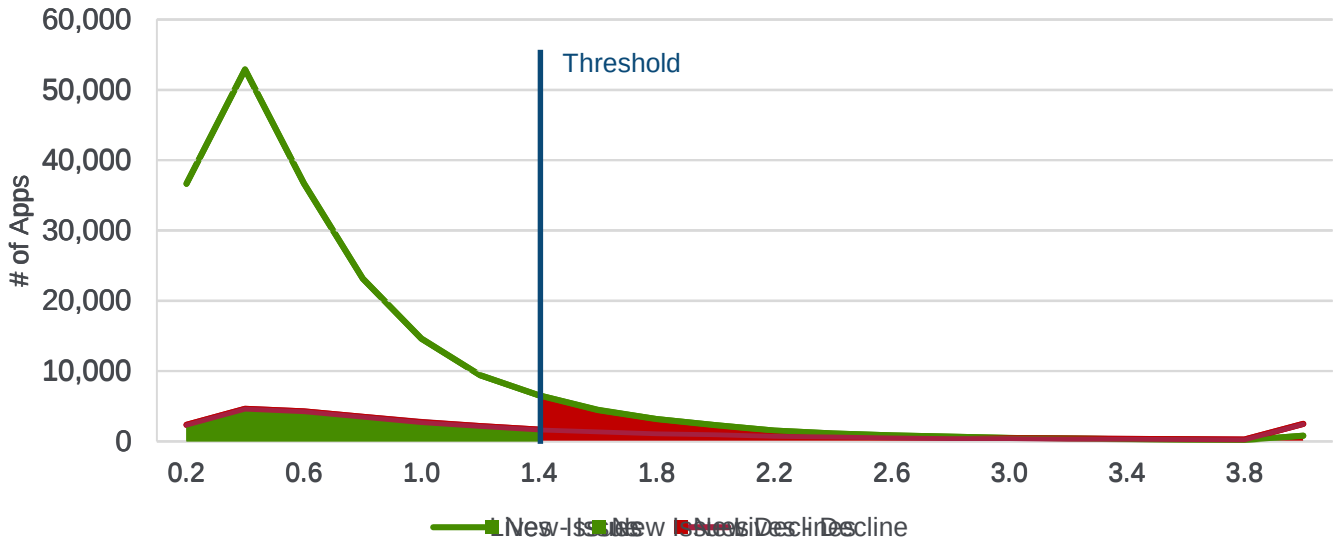
Thresholds can be adjusted to achieve desired business results.



*Hit = Rx hit *or* Credit Hit

Set Risk Score threshold to issue the same amount of business.

- Some declined premium now gets issued
- Equal amount of issued premium now gets declined



Issued Cases Relative A/E	
Before Risk Score w/ Credit	**After Risk Score w/ Credit**
82%	71%

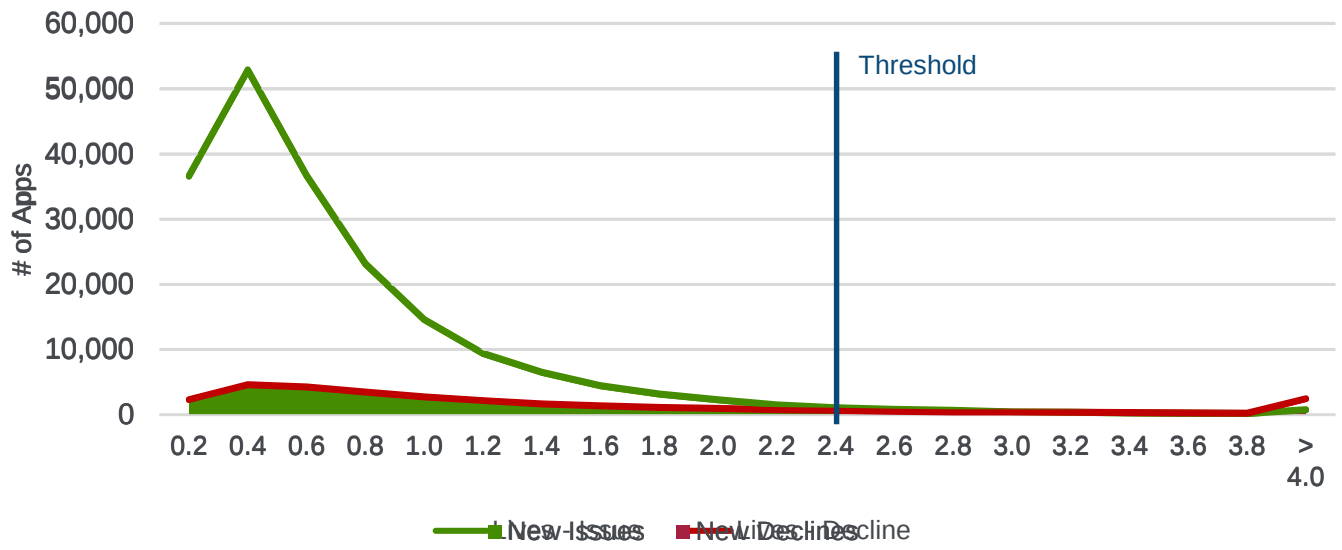
Same amount of business issued

12% Mortality improvement

$13.7 Million increase in profit

Set Risk Score threshold to maintain the same mortality A/E.

- Much of the declined premium now gets issued
- Less of the issued premium now gets declined



Premium Issued	
Before Risk Score w/ Credit	**After Risk Score w/ Credit**
$115.5M	$129.9M

Same mortality A/E

12% More issued business

$14.4 Million increase in premium

Implementation Considerations

- Threshold Setting
  - With retrospective study vs. without
- Operational challenges
  - Change in underwriting
  - Field underwriting more difficult
  - Carrier / agent communication challenges
- NY Circular Letter

Milliman

Thank you!

RiskDimensions℠
Digital Health Data Scoring

Dianne Schuetz
VP, Business Initiatives, U.S. Markets, RGA

07.29.2019

RGA

- **New Opportunity, New Challenge**
- Purpose-Built Industry Solution
- Practical Applications

What is Digital Health Data (DHD)?

Electronic clinical & claims data


CLAIMS DATA


DIAGNOSES

RX


PROCEDURES


TESTS


LABS

Obtained from a variety of digital health sources


HEALTHCARE PAYERS & PBMs


HEALTHCARE PROVIDER EHR


HEALTH INFO EXCHANGES (HIEs)


CONSUMER HEALTH PORTALS


AGGREGATORS

Why Score?

DHD is complex with hundreds of thousands of codes

Code Category	Code Sets	Total Code Volume
Drugs	RxNorm; NDC	625,000+
Labs	LOINC	85,000+
Procedures	ICD-9-PCS; HCPCS/CPT; ICD-10-PCS	100,000+
Diagnoses	ICD-9: ICD-10; SNOMED-CT	420,000+

Multiple medical vocabularies in the form of codes and code sets must be carefully dissected and understood.

Effective underwriting with DHD requires a deep understanding of risk associated with each code and group of codes

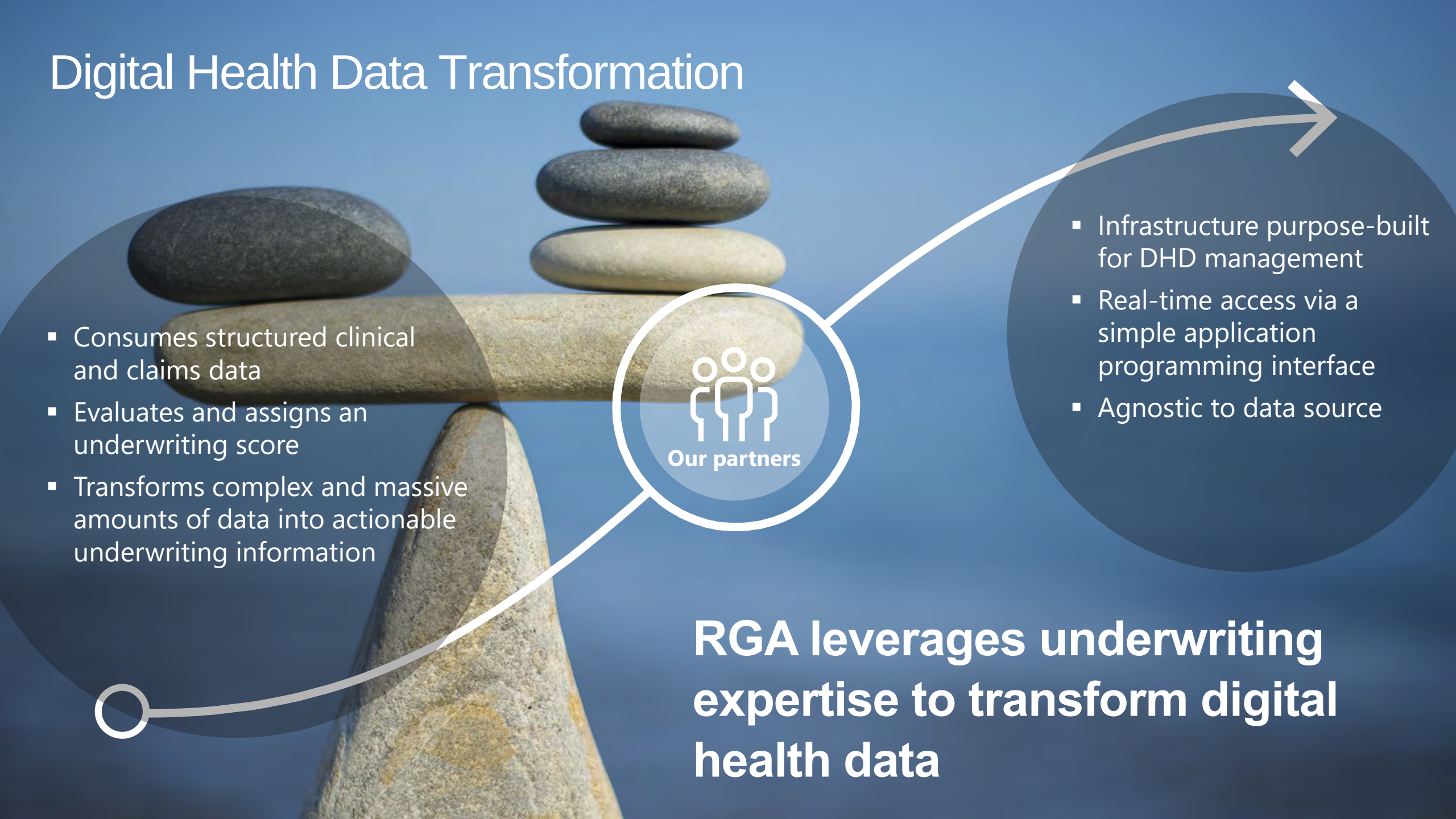
Our Favorites

- **V95.43XS:** Spacecraft collision injuring occupant, sequela.
- **220947004:** Bitten or struck by crocodile or alligator, occurrence on street or highway (event).
- **W59.22XD** Struck by turtle, subsequent encounter.
- **V97.33XD:** Sucked into jet engine, subsequent encounter.
- **W56.21X:** Bitten by Orca.
- **Z63.1:** Problems in relationship with in-laws.
- **W61.43:** Pecked by a turkey.
- **Y93.D1:** Injured while knitting or crocheting.
- **Z56.4:** Discord with boss and workmates.

RGA

- New Opportunity, New Challenge
- **Purpose-Built Industry Solution**
- Practical Applications

Digital Health Data Transformation



- Consumes structured clinical and claims data
- Evaluates and assigns an underwriting score
- Transforms complex and massive amounts of data into actionable underwriting information

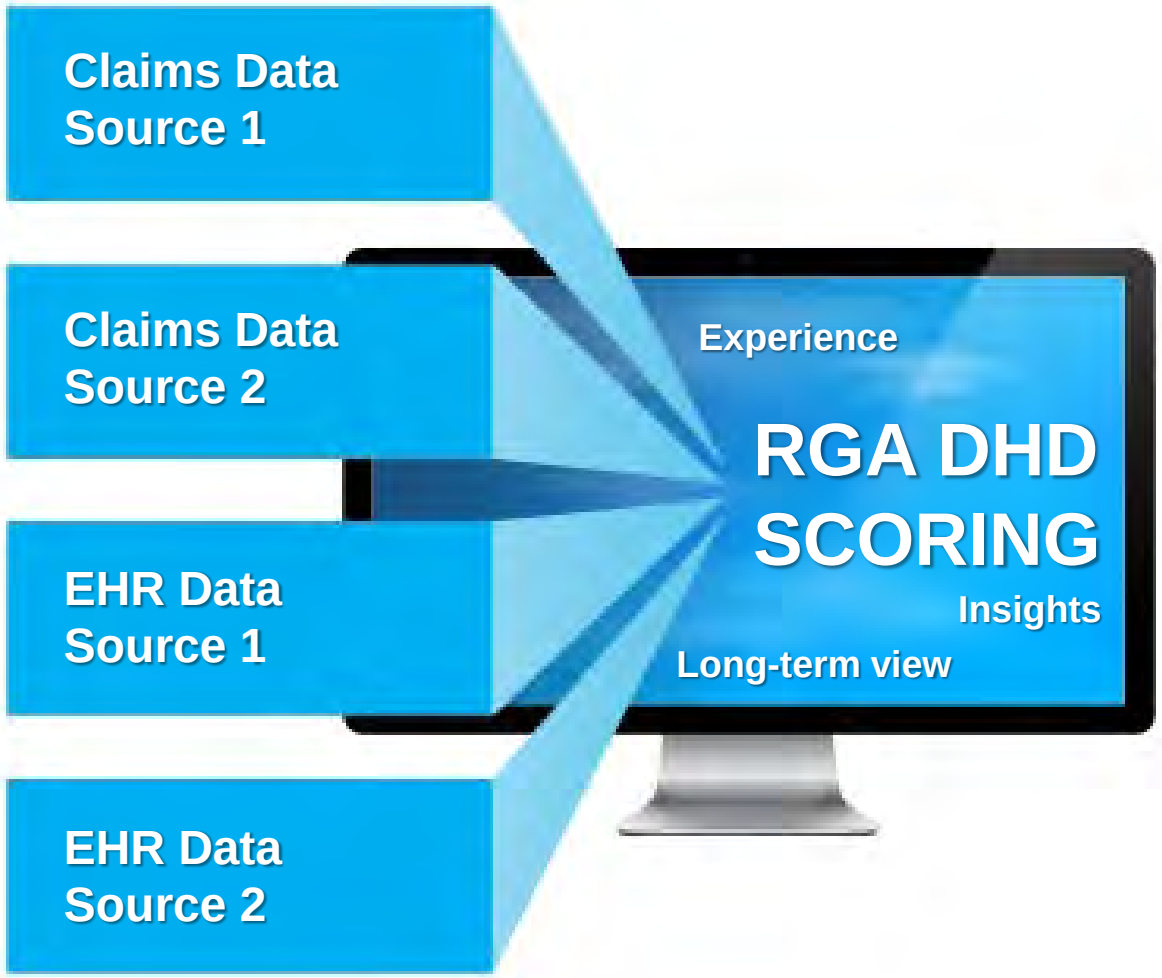
Our partners

- Infrastructure purpose-built for DHD management
- Real-time access via a simple application programming interface
- Agnostic to data source

RGA leverages underwriting expertise to transform digital health data

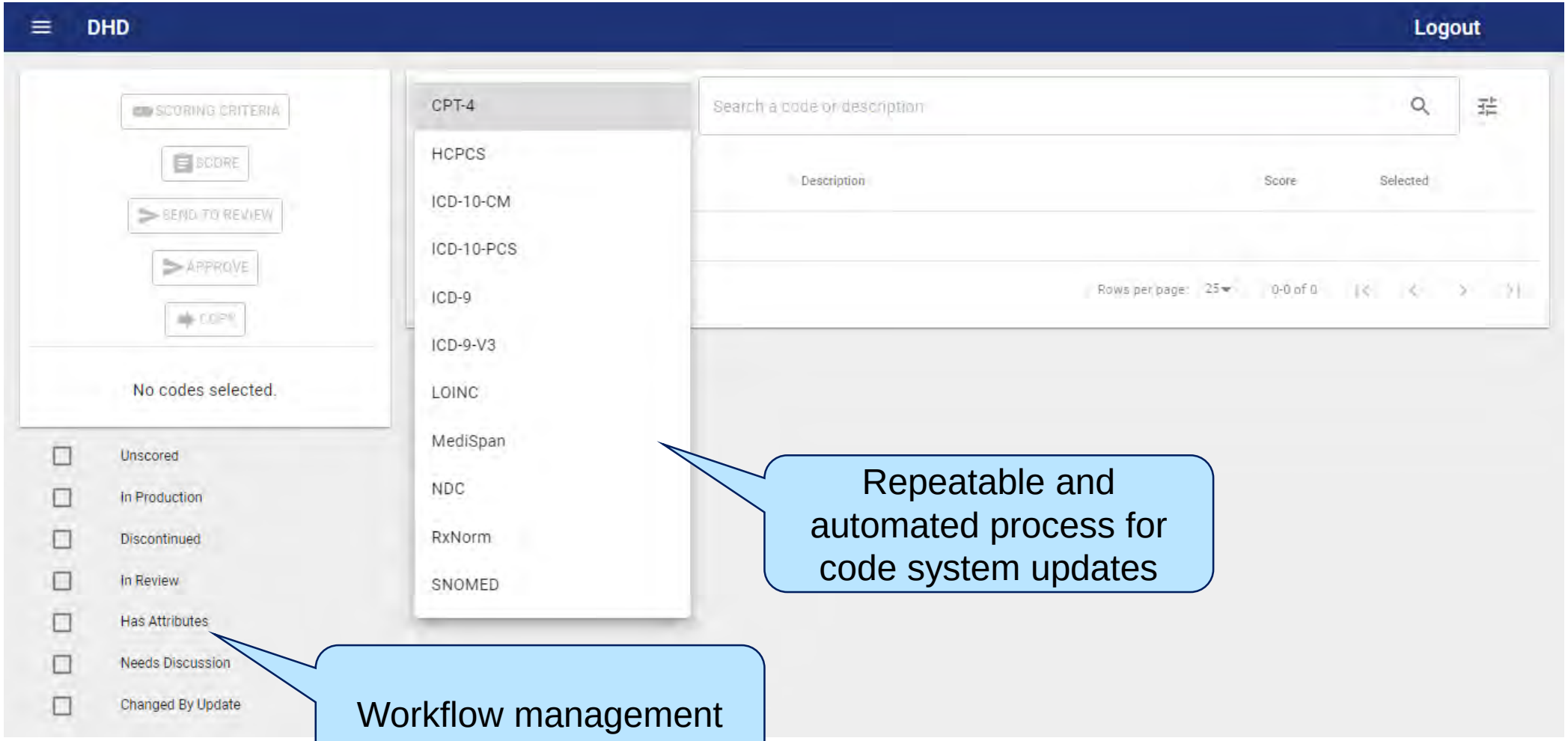
An Industry Solution

Transforming data into actionable underwriting insights



Actionable Underwriting Information

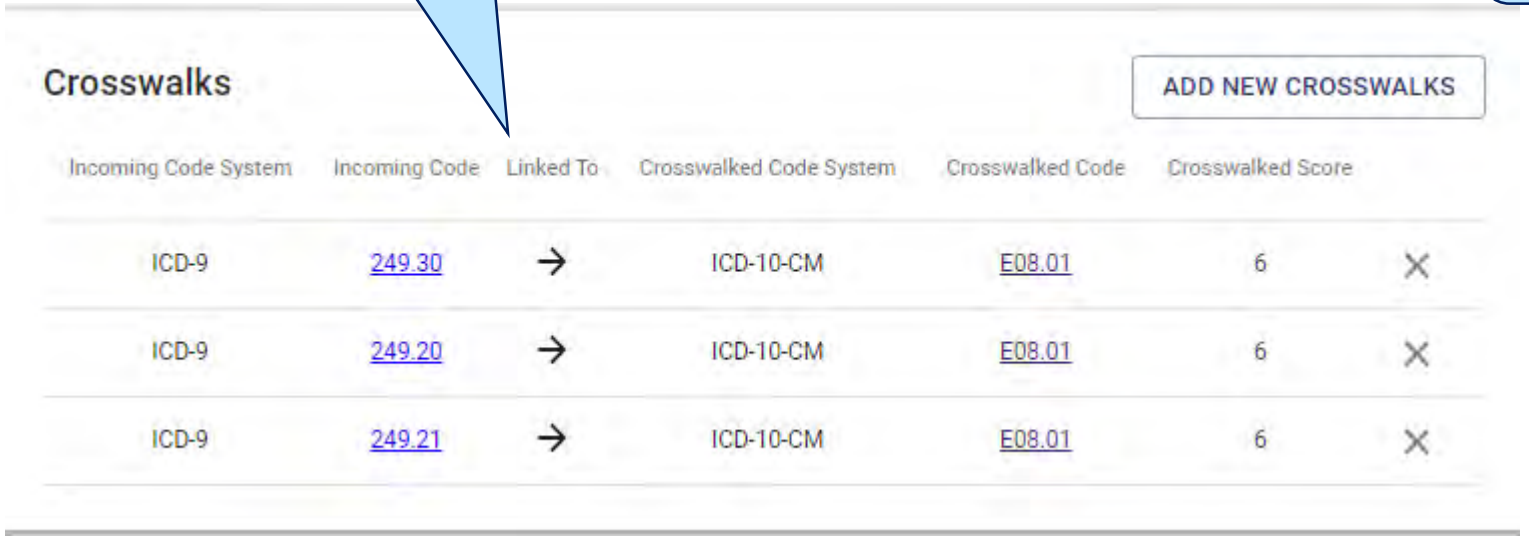
Managing Code Sets



Relationships Between Code Sets

How does one code relate to another?

Clinical is not the same as underwriting

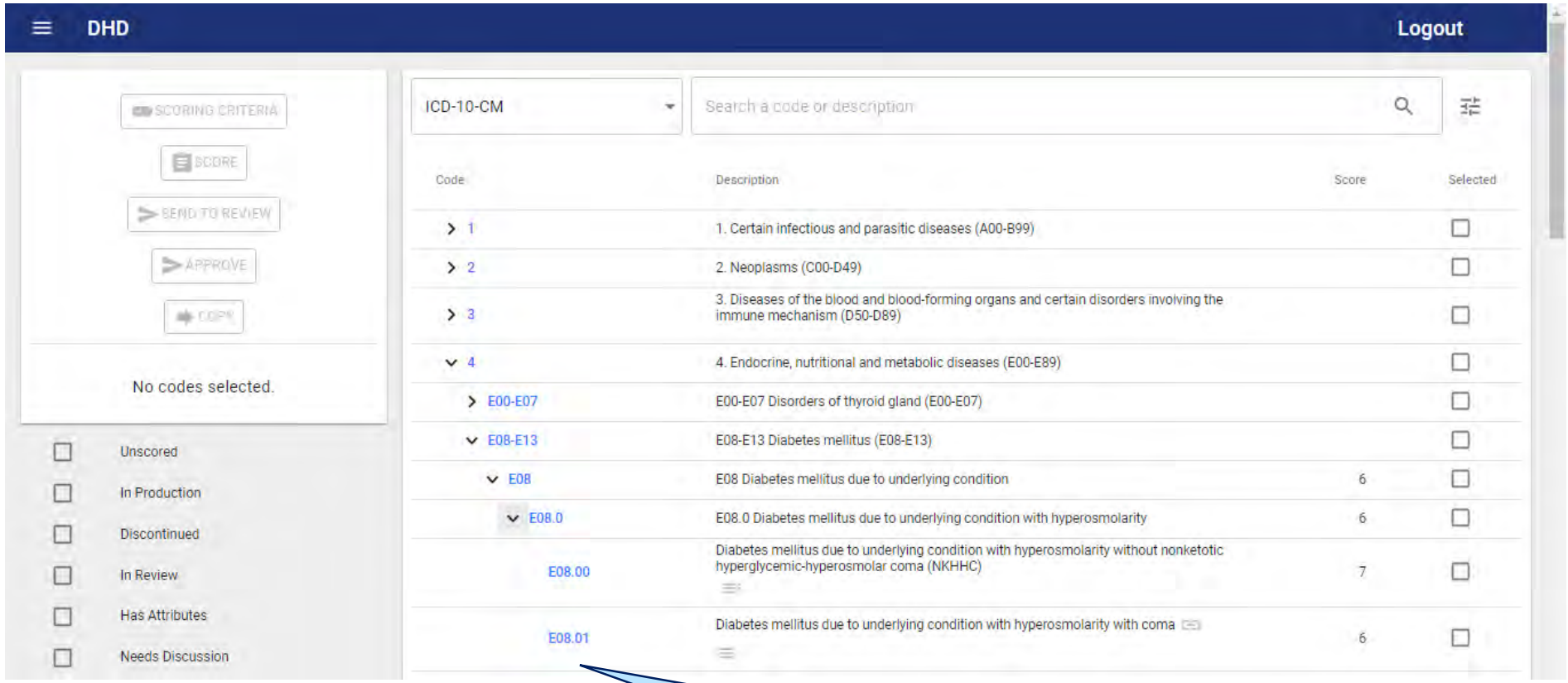


Crosswalks

ADD NEW CROSSWALKS

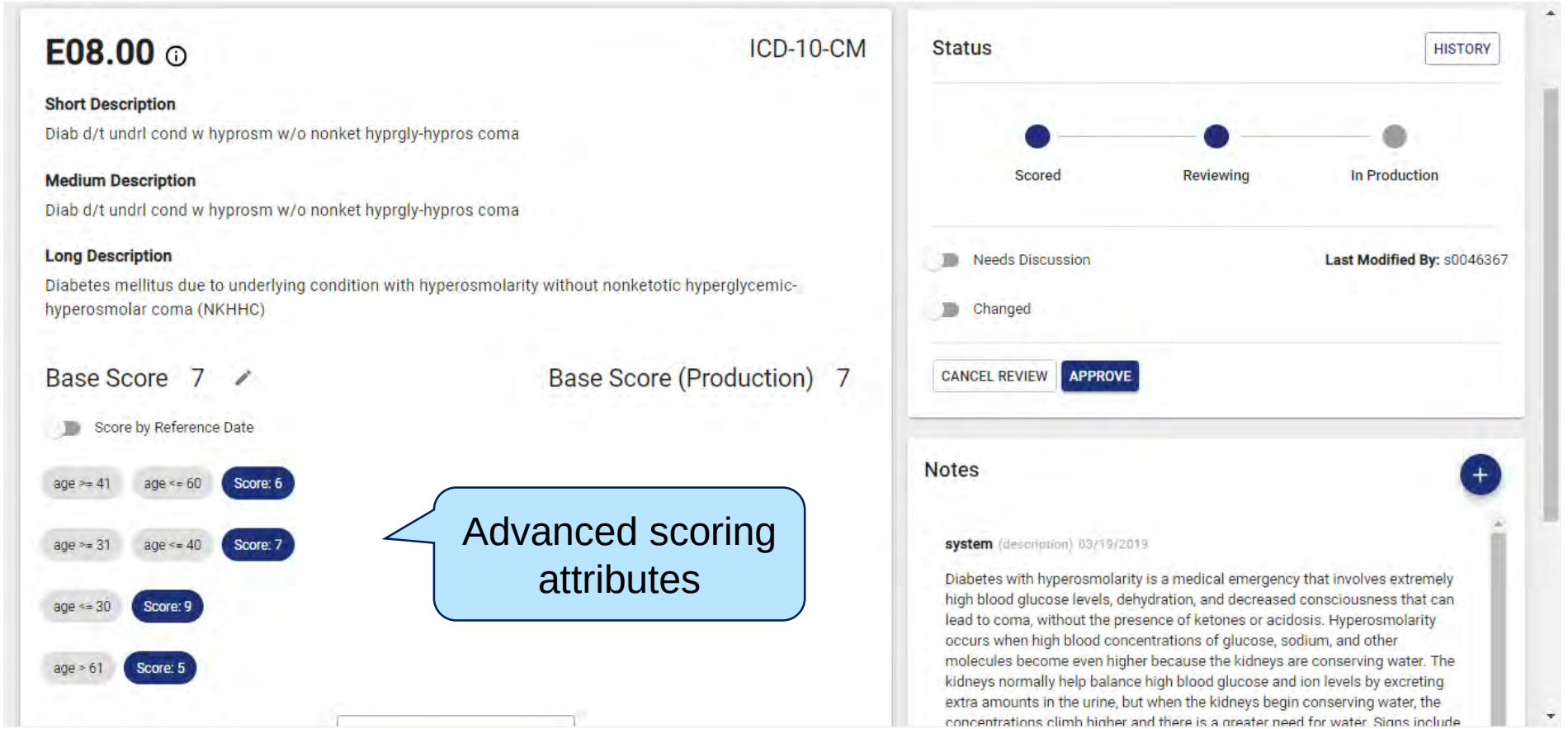
Incoming Code System	Incoming Code	Linked To	Crosswalked Code System	Crosswalked Code	Crosswalked Score	
ICD-9	249.30	→	ICD-10-CM	E08.01	6	✕
ICD-9	249.20	→	ICD-10-CM	E08.01	6	✕
ICD-9	249.21	→	ICD-10-CM	E08.01	6	✕

Scoring



Utilizes global healthcare standards

Scoring Attributes



RGA

- New Opportunity, New Challenge
- Purpose-Built Industry Solution
- **Practical Applications**

Leveraging DHD Scoring

- Right size, right fit use case
  - Data source/aggregator pilot comparison
  - Additional source of data for triage
  - Preferred knock-out
  - Ensure that significant risk is not missed

- Benefits
  - Consistent underwriting assessment
  - Ability to effectively assess large amounts of coded data and begin automating

Significant Risk Detection

Use case for life underwriting

Applicant Demographics

- Male, Age 55; Married, NS
- Height 6’0”, Weight 184
- Average BP 120/83

All Standard

Problem List

34713006	Vitamin D Deficiency	3
272.4	Hyperlipidemia	3
I10	Essential (primary) hypertension	3
K21.9	Gastro-esophageal reflux disease without esophagitis	2
E03.9	Hypothyroidism, unspecified	3

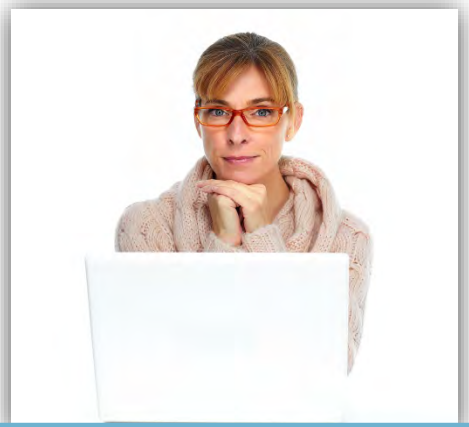
59282003	Pulmonary Embolism	5
193462001	Insomnia, Unspecified	2
133971000119108	Chronic Pulmonary Embolism	9
48694002	Anxiety	4

*Decline!

RGA *Actual fully underwritten decision based on APS: Decline

Acceleration Eligibility

Use case for life underwriting



Applicant Demographics*

- Female, Age 50; Married, NS
- Height 5’4”, Weight 126
- Average BP 133/82

All Standard

Problem List (10/17 – 05/19)

E78.0	Pure Hypercholesterolemia	3
I10	Essential (primary) hypertension	3

Rx

	Diovan	4
	Pravachol	3

Accelerated

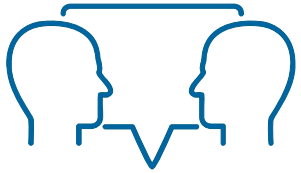
Procedures (10/17 – 05/19)

93784	Ambulatory blood pressure monitoring…	1
3075F	Most recent systolic blood pressure 130-139 mm Hg	1
3079F	Most recent diastolic blood pressure 80-89 mm Hg	1
80061	Lipid panel…	1
82465	Cholesterol, serum or whole blood, total	1
83718	Lipoprotein, direct measurement, high density cholesterol (HDL cholesterol)	1
84478	Triglycerides	1

RGA DHD Scoring Foundation

Longstanding DHD expertise

A decade of DHD expertise



RGA underwriting expertise

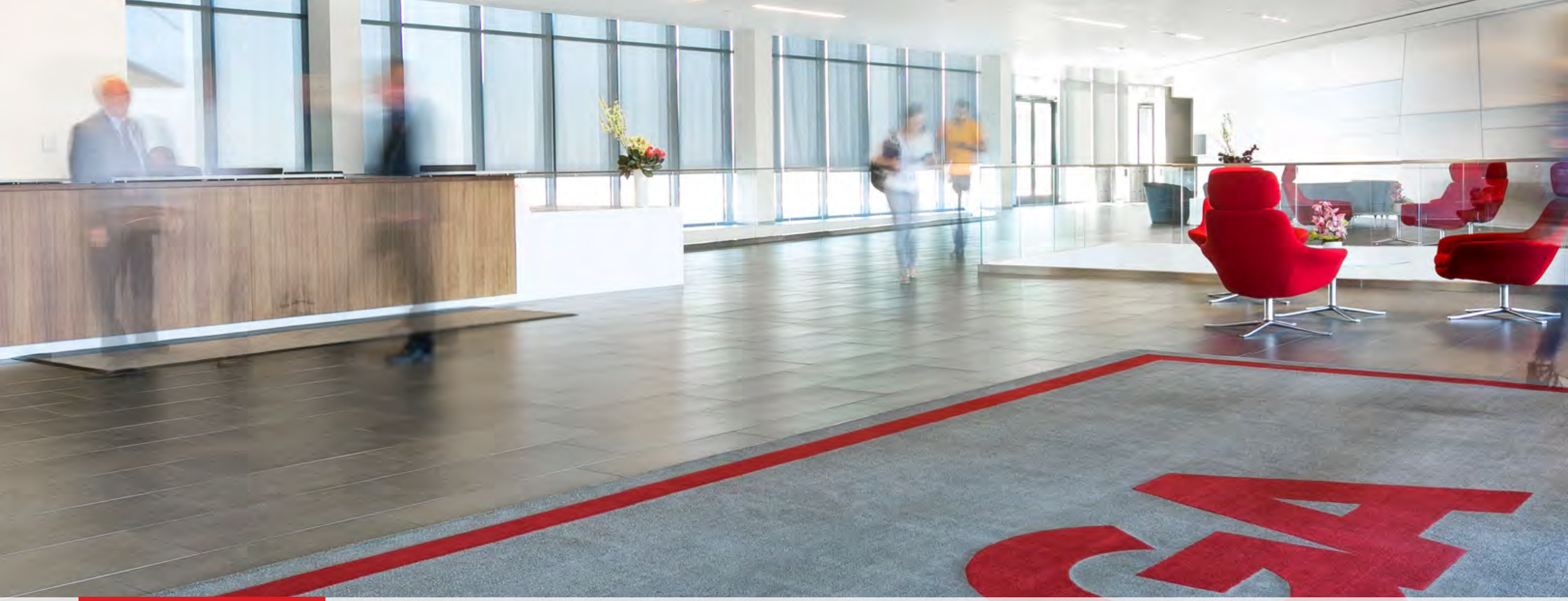
RGA has underwritten more than three million cases

Long-term perspective as a risk-sharing partner

Vested stake in accuracy and long-term results

Industry solution

Agnostic to data source



Thank you